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Radiation Control Technician

An exciting career with growth potential

Scott Engeman
October 14, 2020

Introduction

- Previously studied geology and worked retail.
- 2010 – Started RCT education and training.
 - Hanford site in Washington State.
 - U.S. Naval Shipyard in San Diego, California.
- 2012 – Started at LANL
 - Tech Area 54 “Boxline” RCT 3
 - Tech Area 3 Science, Technology Operations RCT 3-5
- 2019 – Member of the National Registry of Radiation Protection Technologists (NRRPT) and the Health Physics Society: Rio Grande Chapter.

Terms

Radiation Control

versus

Radiation Protection

versus

Health Physics

Short History of RP

- 1895 – Wilhelm Roentgen discovers x-rays
 - Also learns that exposure could damage human tissue.
- 1902 – The first dose limit of 10 R per day
 - Limit of photographic plates to detect radiation.
- 1924 – Introduction of tolerance dose of 70 rem per year
 - Limit of observable biological effects and a safety factor of 10.
- 1957 – Reduced the limit to 5 rem per year
 - Based on cancer rates of x-ray workers and Japanese atomic bomb survivors.

Meinhold et al. (1995). Radiation and Risk—A Hard Look at the Data. *Los Alamos Science*, (23), 116-123. <https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-95-4005-04>

Short History of RP

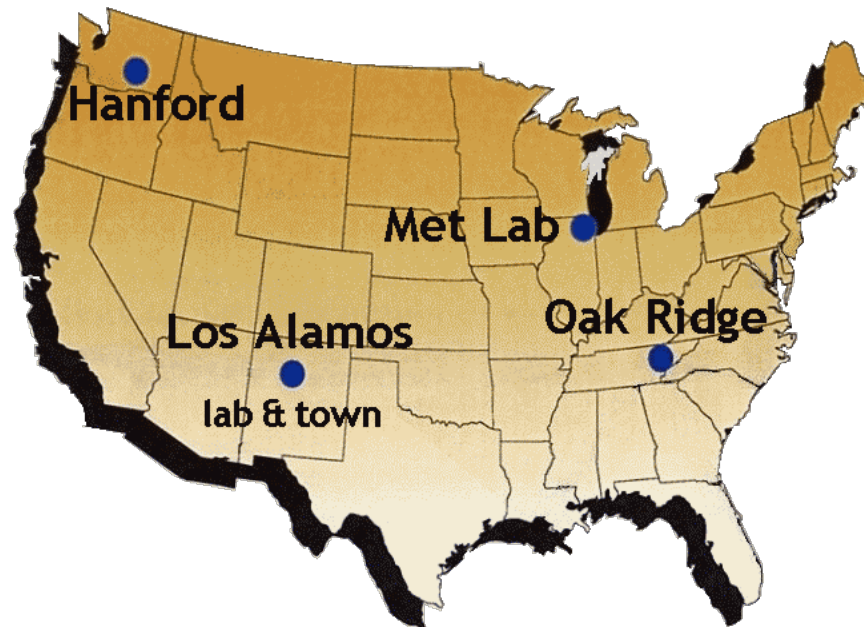
- 1977 – ALARA becomes a law!
 - *As Low As Reasonable Achievable*

“However, the fundamental tenets of health physics, including the basic tools such as film badges and dosimeters—which measure radiation exposure in a variety of ways—and practices such as minimizing **time**, maximizing **distance**, and using **appropriate shielding** remain the same since the Manhattan Project” (Atomic Heritage Foundation, 2017).

Atomic Heritage Foundation. (2017, June 29). *Health Physics & Nuclear Medicine After the Manhattan Project*.
<https://www.atomicheritage.org/history/health-physics-nuclear-medicine-after-manhattan-project>

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Manhattan Project



Beginning in August of 1942

The Manhattan Project. (n.d.). [Places of the Manhattan Project].

https://www.osti.gov/opennet/manhattan-project-history/images/places_image.htm

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Manhattan Project – Hanford

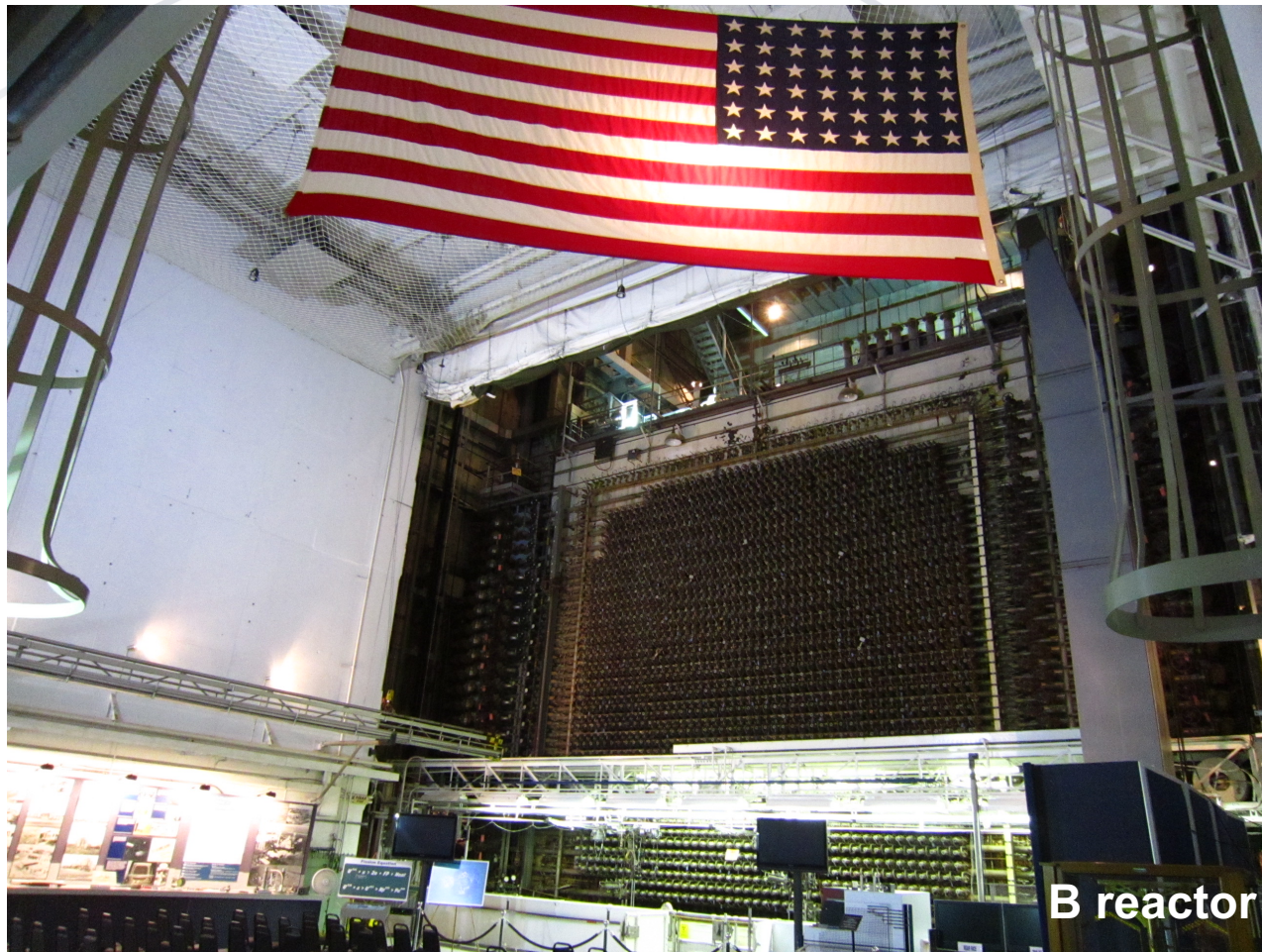


C and B reactors

Taken by: Scott Engeman 5/17/2010

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Manhattan Project – Hanford



Taken by: Scott Engeman 5/17/2010

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Manhattan Project – Hanford

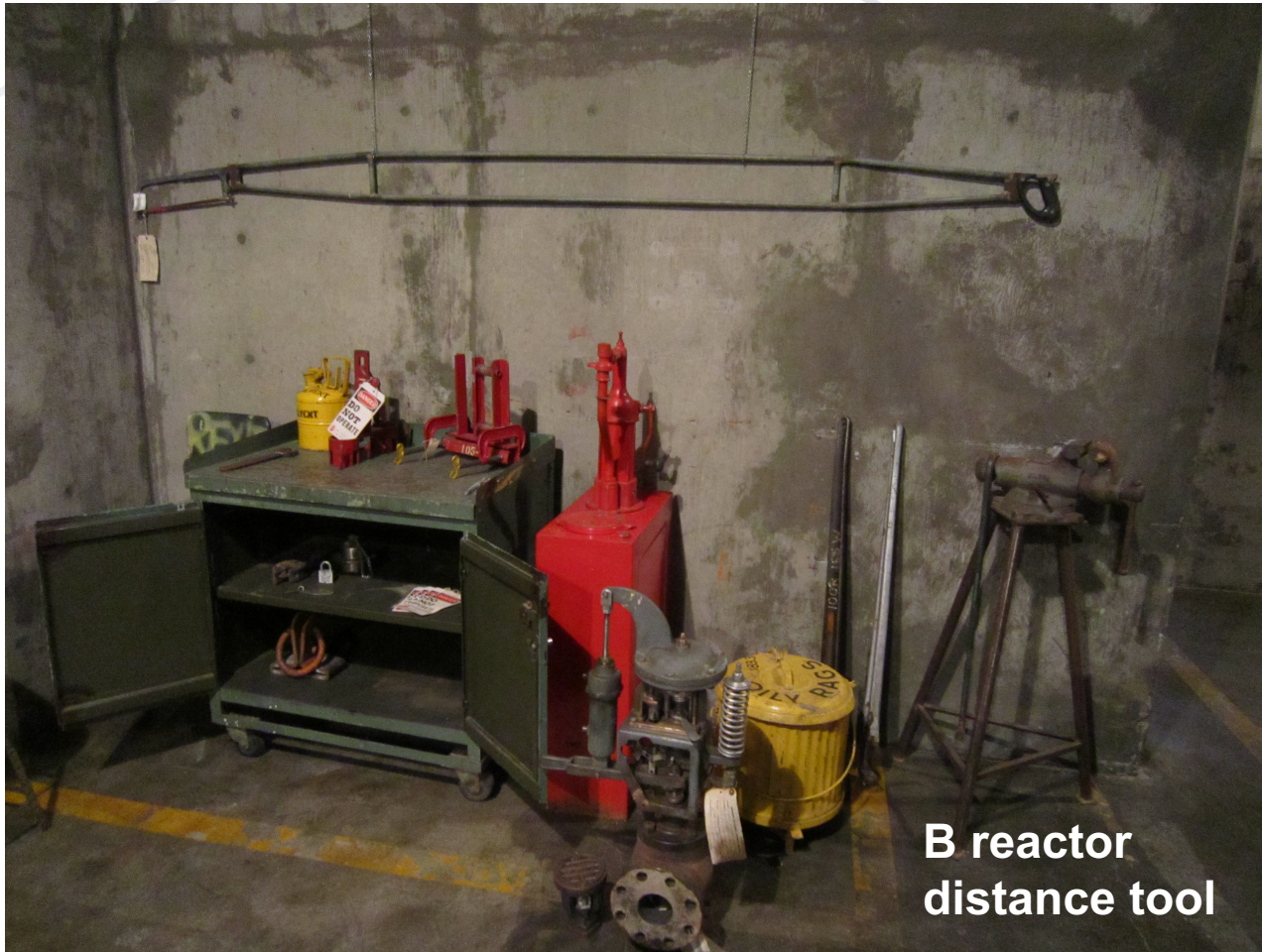


**B reactor
control room**

Taken by: Scott Engeman 5/17/2010

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Manhattan Project – Hanford



**B reactor
distance tool**

Taken by: Scott Engeman 5/17/2010

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Manhattan Project – Hanford



Taken by: Scott Engeman 5/17/2010

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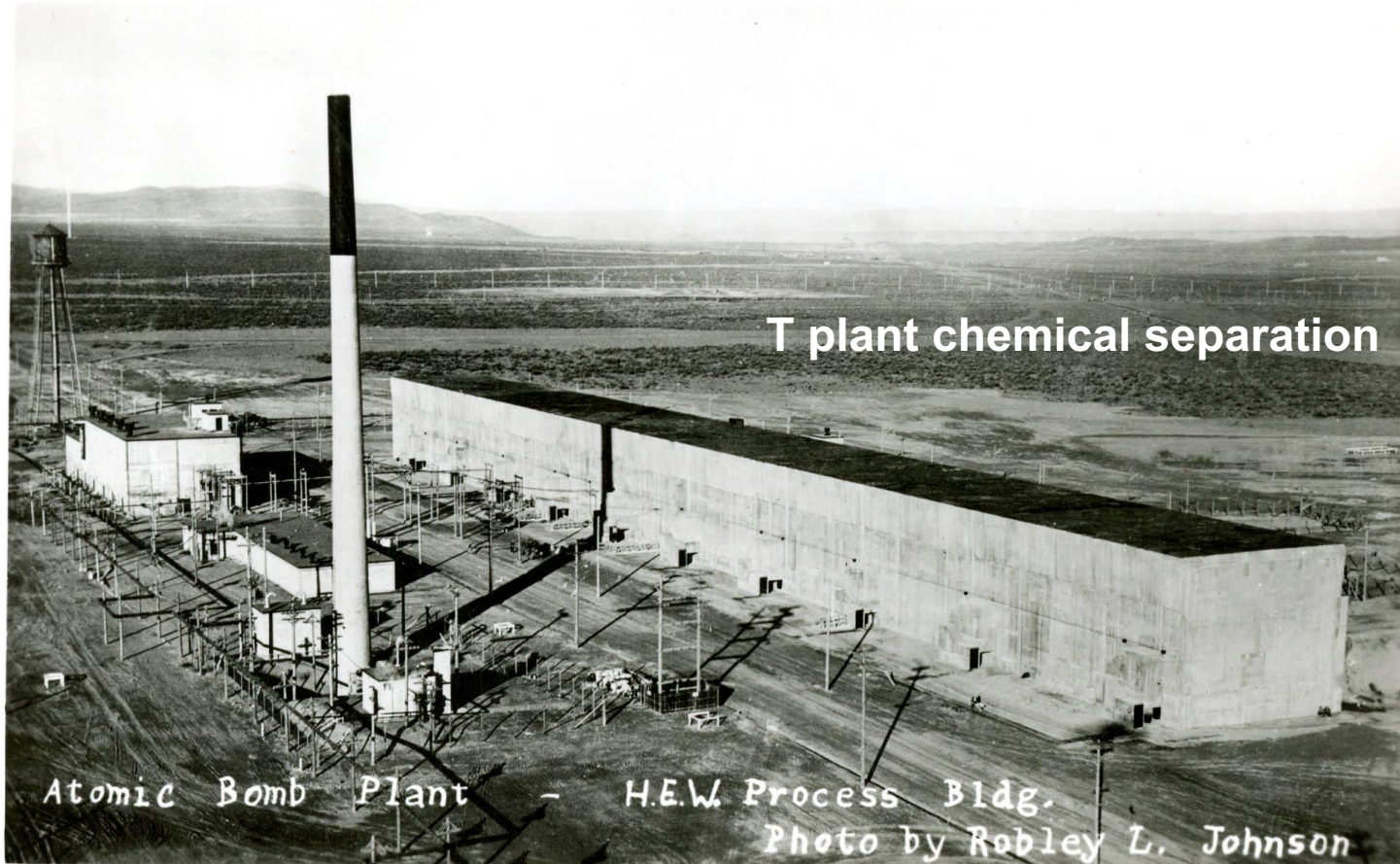
Manhattan Project – Hanford



<https://www.flickr.com/photos/departmentofenergy/>

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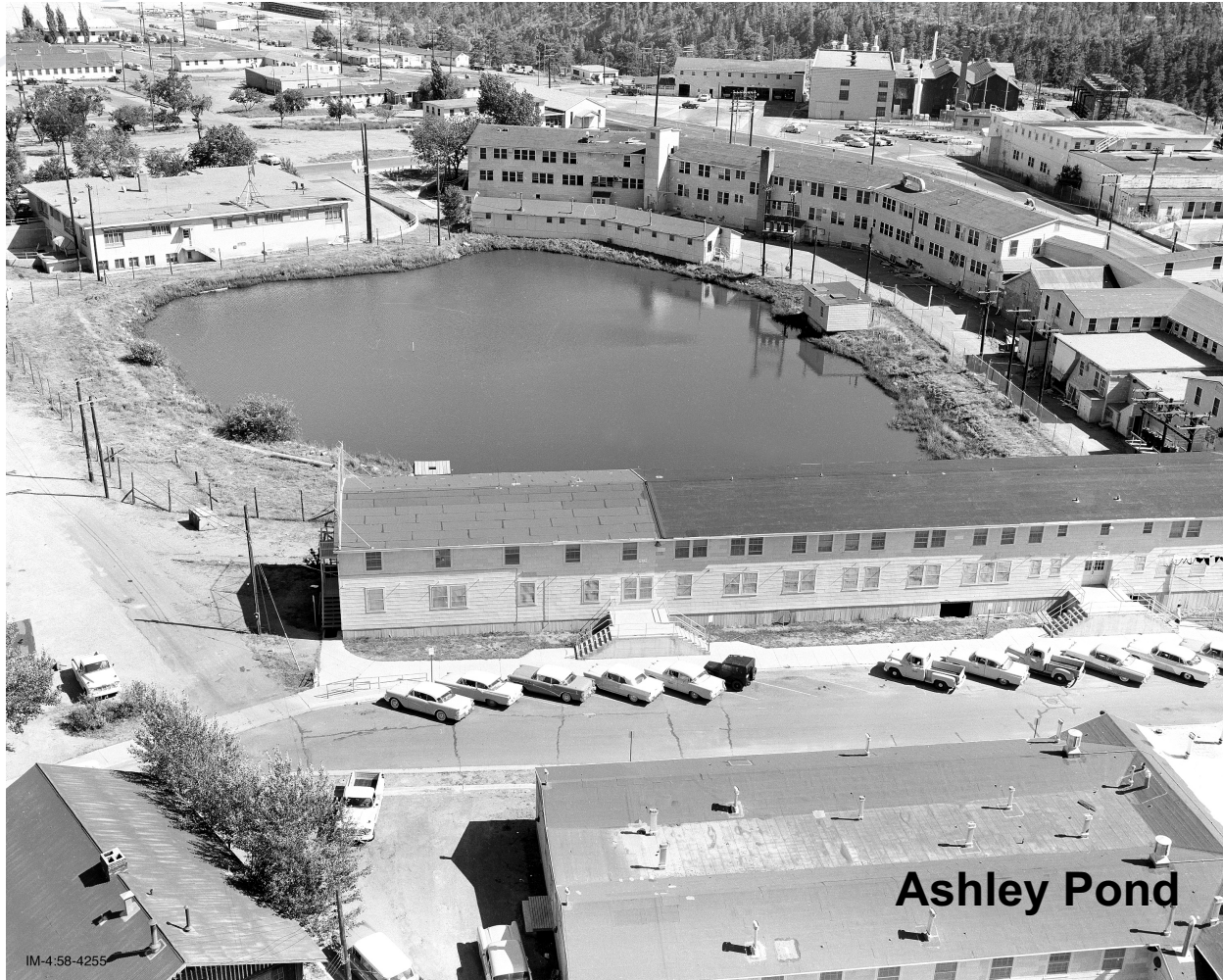
Manhattan Project – Hanford



<https://www.flickr.com/photos/departmentofenergy/>

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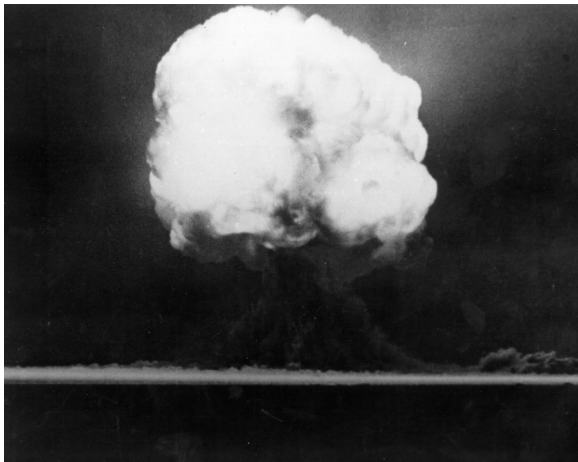
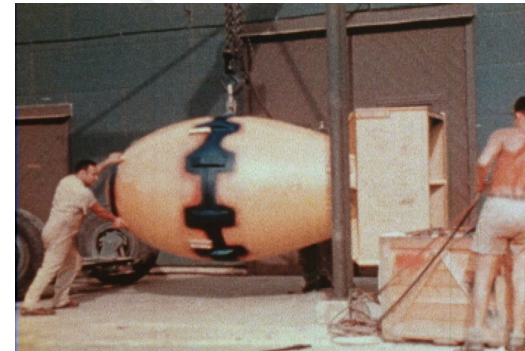
Manhattan Project – Los Alamos



<https://www.flickr.com/photos/departmentofenergy/>

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Manhattan Project – Los Alamos



Trinity test - July 16, 1945



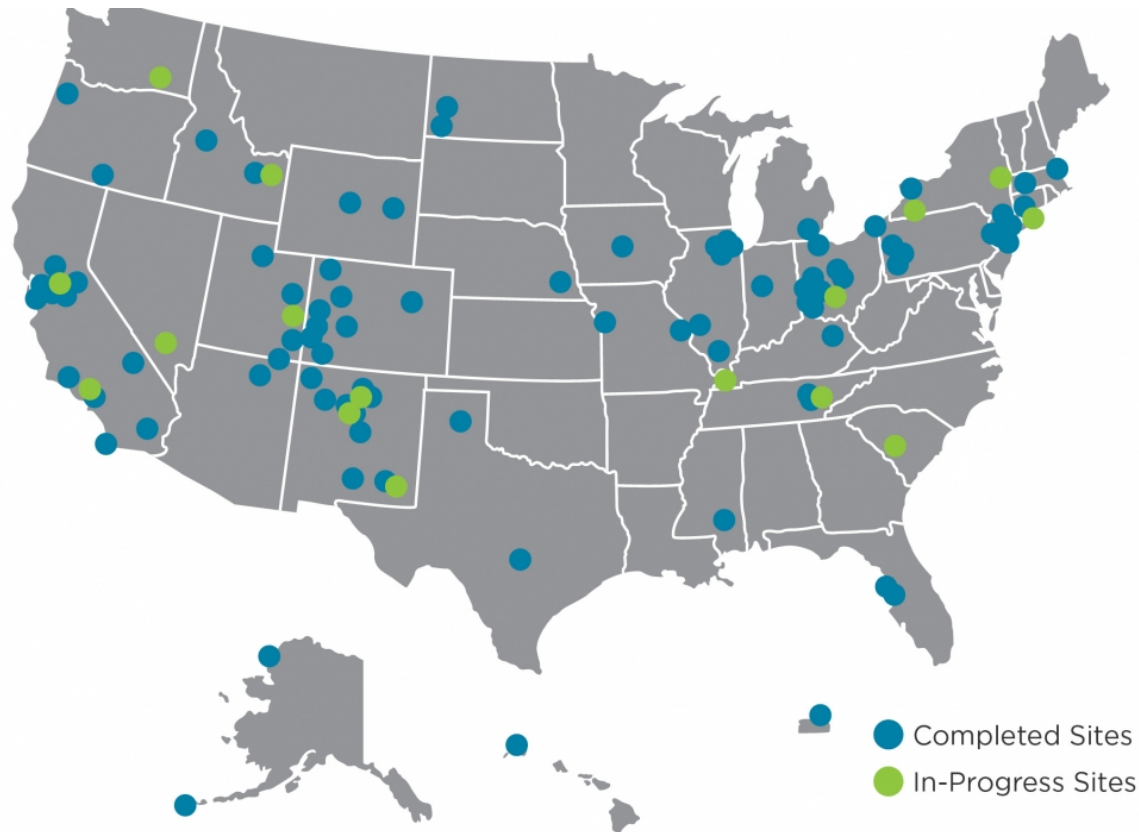
Nagasaki bombing - August 9, 1945

<https://www.flickr.com/photos/departmentofenergy/>

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Opportunities for RCTs

The U.S. Department of Energy's (DOE) Office of Environmental Management (EM) Sites

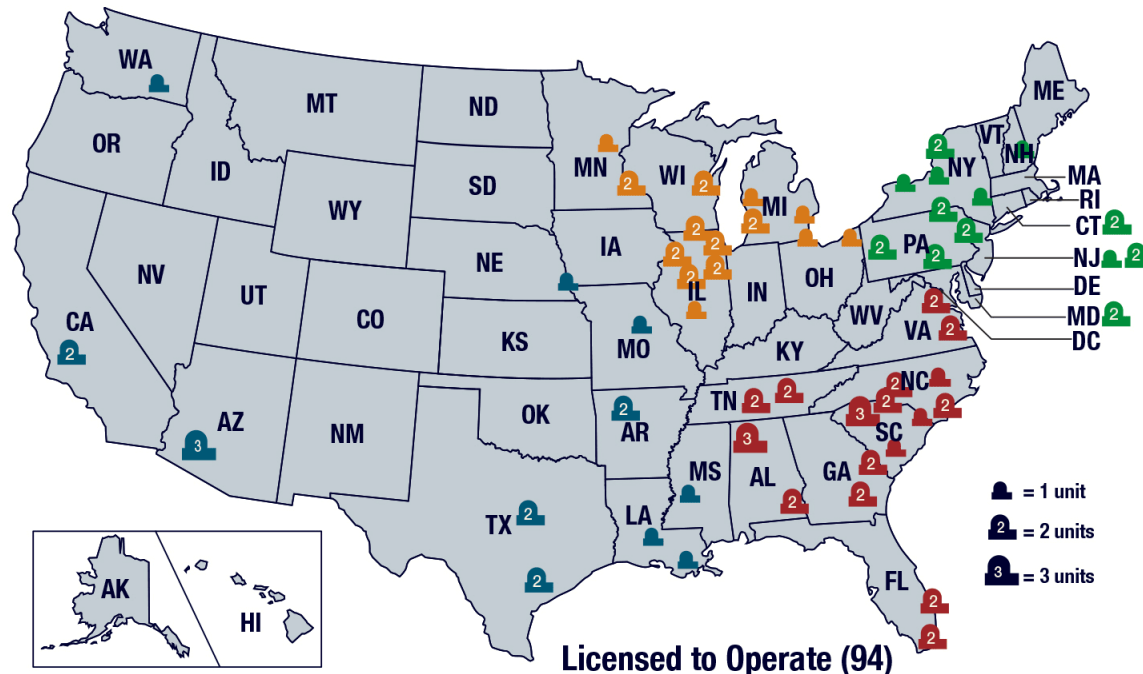


EM Sites. (n.d.). [Photo of EM sites]. <https://www.energy.gov/em/about-us>

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Opportunities for RCTs

U.S. Operating Commercial Nuclear Power Reactors

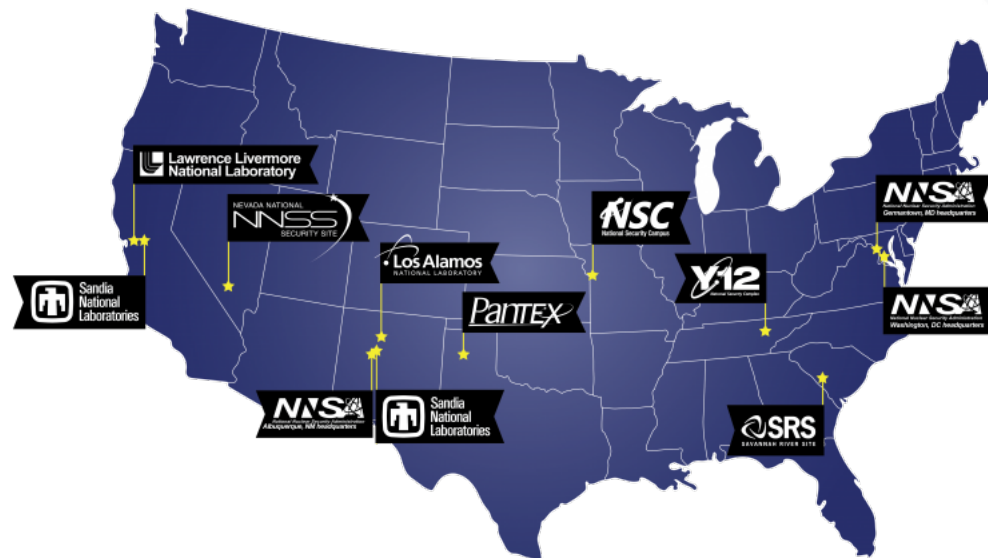


Map of Power Reactor Sites. (2018). [Photo of sites].

<https://www.nrc.gov/reactors/operating/map-power-reactors.html>

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Opportunities for RCTs



National Nuclear Security Administration. (n.d.). [Photo of sites].

<https://www.energy.gov/nnsa/national-nuclear-security-administration>

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Opportunities for RCTs

- BLS groups NRC and DOE
 - NRC is expecting a decrease as nuclear power plants are nearing their end-of-life.
- LANL is unique
 - In need of RCTs right now.
 - Expected continued need with retirement of many workers.

OCCUPATIONAL OUTLOOK HANDBOOK

Occupational Outlook Handbook > Life, Physical, and Social Science >

Nuclear Technicians

Summary What They Do Work Environment How to Become One Pay Job Outlook S

Summary

Quick Facts: Nuclear Technicians	
2019 Median Pay ?	\$82,080 per year \$39.46 per hour
Typical Entry-Level Education ?	Associate's degree
Work Experience in a Related Occupation ?	None
On-the-job Training ?	Moderate-term on-the-job training
Number of Jobs, 2019 ?	6,700
Job Outlook, 2019-29 ?	-19% (Decline)
Employment Change, 2019-29 ?	-1,300

Nuclear Technicians. (September, 2020). U.S. Bureau of Labor Statistics

<https://www.bls.gov/ooh/life-physical-and-social-science/nuclear-technicians.htm#tab-1>

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Opportunities for Radiation Protection

- There are other opportunities in:
 - Nuclear Medicine.
 - Environmental monitoring for State and Local governments.
 - Law enforcement laboratories, such as FBI and DHS.
 - International organizations, such as the IAEA.

With continued education, the list of opportunities
just
keeps
going

A typical day...

- I start my day...
 - *This could be in an office or with other RCTs.*
- Work assignments are given...
 - *This could be performing routine monitoring of a series of rooms or working along side and monitoring others while work is being performed.*
- Instruments are checked prior to use...
 - *Isotopes and working conditions will dictate which instruments to use.*

A typical day...

- Before we work...
 - *Am I trained? Is my training up to date?*
 - *Do I have my documents that define and authorize the work? Are they current?*
- Attend the pre-job briefing...
 - *We talk about the work, read the Radiological Work Permit (RWP) and discuss the expected radiological conditions, suspension limits and other information.*
 - *We talk about what could go wrong, what we will do to prevent this, and what we will do if it does go wrong.*

A typical day...

- Prepare to do work...
 - *Put on protective clothing (if applicable).*
 - *Check instruments again to make sure they are working.*

Everyone feeling good?

Last check that you have everything!

Let's make sure you're suited up properly...

Slow and deliberate...

Listen to your RCT and don't touch your face.

Okay, let's go to work!

A typical day...



(O. Wilton, personal communication, July 1, 2014.)

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A typical day...



(O. Wilton, personal communication, July 1, 2014.)

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A typical day...



<https://www.flickr.com/photos/losalamosnatlab/>

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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...



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A typical day...

- After the work is done...
 - *Depending on the area, workers and items are monitored before we leave.*
- Then I document what was done...
 - *Survey reports are documents in which the important information is recorded. Such as instruments used, areas and items monitored, instrument readings, and a description of the work.*
 - *These are reviewed by a manager and filed as a record to be stored.*

A typical day as a senior RCT...

- I could also be involved in:
 - Issuing instructions to other RCTs.
 - Walking down a job to understand the work scope.
 - Writing a Radiological Work Permit.
 - Talking with other organizations to plan work.
 - Answering emails or phone calls.
 - Issuing temporary dosimetry.
 - Requesting supplies.
 - Taking training courses.
 - Training others.

Then...

ALARMS

RCT response...



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RCT response...

- RCTs are trained to respond to various types of situations.
- Sometimes we assist medical personnel in checking a contaminated person.

Why LANL?



<https://www.flickr.com/photos/losalamosnatlab/>

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Why LANL?

- LANL is located in beautiful New Mexico.
- LANL has competitive pay rates.
- The benefits are excellent.
- The lab is actively hiring to replace an aging workforce.
- The weather, schools, culture are great!

Los Alamos County was ranked #1 in the top 500 Healthiest Communities nationwide according to a 2020 U.S. News report.

Healthiest Communities Rankings 2020. (2020). U.S. News & World Report.
<https://www.usnews.com/news/healthiest-communities/rankings>.

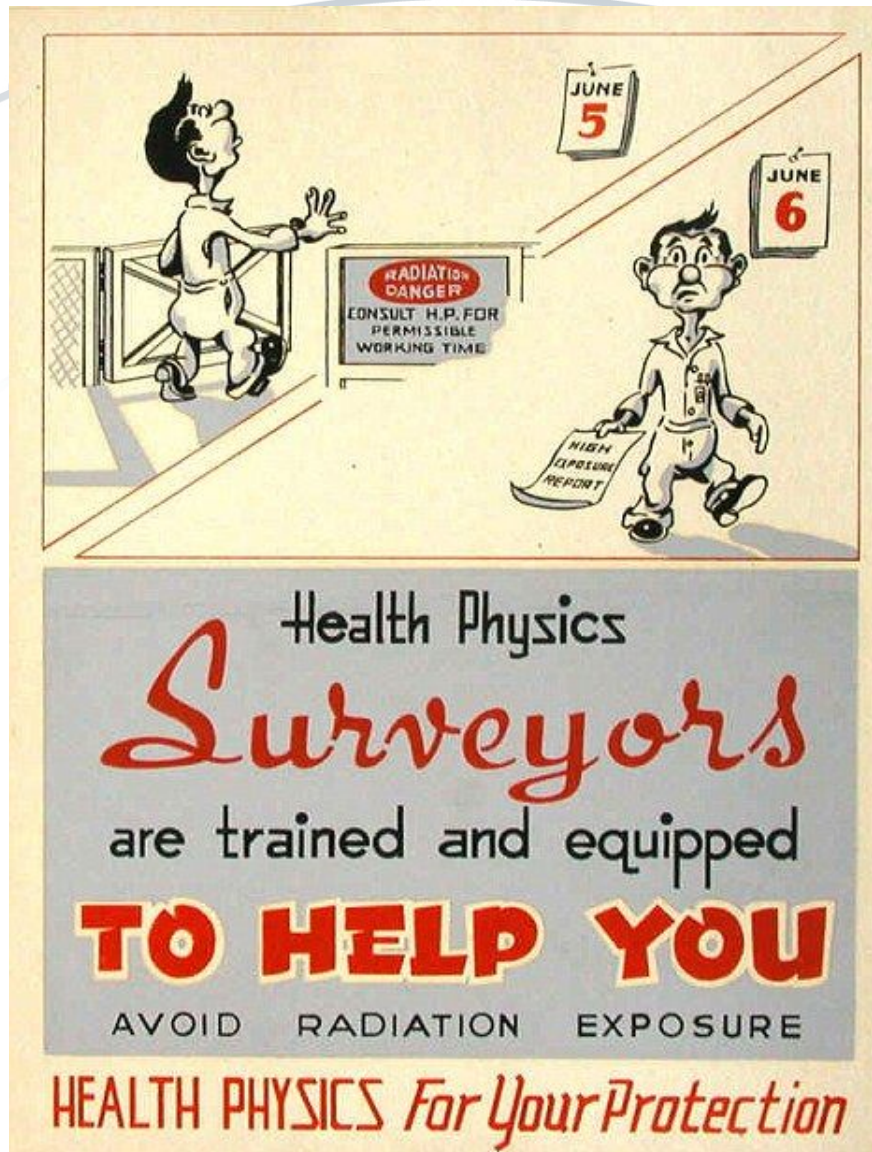
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In summary...

- RCTs are always needed.
- The work that RCTs support is very interesting and important to our Nation.
- The RCTs around LANL are all one big team!
- Sometimes the work is very exciting, especially when responding to an alarm.
- RCTs are always training.
- Some jobs require a respirator or coveralls, which can be uncomfortable when you're new, but it becomes easier.

...every job has little things that might take getting used to, but I have been doing this for over 10 years and I have really enjoyed the work, the people, and the LANL environment.

Questions?



How to stay safe in the atomic age: Charming posters from 1947 which show the health risks from radiation. (February 7, 20120). Daily Mail. <https://www.dailymail.co.uk/news/article-2097846/1947-nuclear-posters-Oak-Ridge-National-Laboratory.html>